

WE CLAIM:

1. A method of severing and sealing a film formed of a thermoplastic material, comprising the steps of:

heating a cutting edge implement to a temperature sufficient to melt but not to burn the thermoplastic material;

feeding a plurality of layers of the film between the cutting edge implement and an opposing surface;

moving the cutting edge implement and the opposing surface relative to one another to pinch the plurality of layers of film therebetween; and

thereafter, suspending any relative lateral movement between the cutting edge implement, the film, and the opposing surface, while relatively biasing the cutting edge implement and the opposing surface together with the plurality of layers of film pinched therebetween, until the cutting edge implement cuts through the plurality of layers of film, contacts the opposing surface, and seals the plurality of layers of film together.

2. A method according to claim 1, wherein the moving step comprises the step of advancing the cutting edge implement in a direction substantially perpendicular relative to a contact area of the opposing surface.

3. A method according to claim 1, wherein the suspending step comprises synchronously moving the cutting edge implement, the film, and the opposing surface in substantially the same lateral direction.

4. A method according to claim 1, wherein the cutting edge implement is a hot wire, and further comprising the step of, prior to the moving step, supporting the hot wire for substantially its entire effective cutting length.

5. A method according to claim 1, wherein the heating step comprises heating the cutting edge implement to a temperature of less than 800° F.

6. A method according to claim 1, wherein the heating step comprises heating the cutting edge implement to a temperature between about 600° F to about 800° F.

5 7. A method according to claim 1, wherein the suspending step comprises suspending relative lateral movement between the cutting edge implement, the film, and the opposing surface for approximately one second.

8. A method of severing and sealing a film, comprising the steps of:
clamping the film between opposing surfaces;
heating a cutting edge implement to a temperature sufficient to melt but not to burn the film; and
moving the cutting edge implement past one of the opposing surfaces toward the other surface so that the cutting edge implement presses against the film toward the other surface for a period of time sufficient to sever the film and seal the resulting severed edges.

9. A method according to claim 8, wherein the heating step comprises heating the cutting edge implement to a temperature of less than approximately 800° F.

20 10. A method according to claim 8, wherein the heating step comprises heating the cutting edge implement to a temperature between 600° F to about 800° F.

25 11. A method according to claim 8, wherein the cutting edge implement is a hot wire, and further comprising the step of supporting the hot wire for substantially its entire effective cutting length.

30 12. A method according to claim 8, wherein the passing step comprises pinching the film between the cutting edge implement and the other surface for approximately one second.

13. A method according to claim 8, wherein the passing step comprises advancing the cutting edge implement through an opening in the one opposing surface.

5 14. A method according to claim 8, wherein the clamping step comprises clamping the film between a rotating drum and an anvil that travels around a closed path at approximately the peripheral speed of the rotating drum.

15. An apparatus for severing and sealing a film formed of a thermoplastic material, comprising:

a cutting edge implement that is heatable to a temperature sufficient to melt but not to burn the thermoplastic material;

an anvil;

means for feeding a plurality of layers of the film between the cutting edge implement and the anvil;

means for moving the cutting edge implement and the anvil relative to one another to pinch the plurality of layers of film therebetween;

2.0 means for suspending any relative lateral movement between the cutting edge implement, the film, and the anvil, while pressing the cutting edge implement toward the anvil with the film pinched therebetween, until the cutting edge implement melts through the plurality of layers of film, contacts the anvil, and seals the plurality of layers of film together.

16. An apparatus according to claim 15, further comprising:

25 means for laterally moving the cutting edge implement along a closed path; and

means for moving the anvil along a path that is at least in part substantially parallel to a portion of the closed path traveled by the cutting edge implement.

17. An apparatus according to claim 16, wherein the cutting edge implement, the film, and the anvil all synchronously move in substantially the same lateral direction while the film is melted and sealed.

5 18. An apparatus according to claim 15, wherein the cutting edge implement is a hot wire that is supported for substantially its entire effective cutting length by an insulating member.

19. An apparatus according to claim 15, wherein the cutting edge implement is heated to a temperature of less than approximately 800°.

20. An apparatus according to claim 15, wherein the cutting edge implement is heated to a temperature between about 600° F to about 800° F.

21. An apparatus according to claim 15, wherein the cutting edge implement comprises a hot wire.

20 22. An apparatus according to claim 15, wherein the suspending means suspends any relative lateral movement between the cutting edge implement, the film, and the anvil for approximately one second.

23. A method of severing and sealing a film formed of a thermoplastic material, comprising:

25 pinching a plurality of layers of the film between a substrate and a cutting edge implement that is heated to a temperature sufficient to melt but not to burn the thermoplastic material, and

30 pressing the cutting edge implement toward the substrate with the plurality of layers of film pinched therebetween, until the cutting edge implement melts through the plurality of layers of film, contacts the substrate, and seals the plurality of layers of film together.

24. A method according to claim 23, further comprising the step of feeding the plurality of layers of film in a lateral direction, and synchronously moving the substrate and the cutting edge implement in the lateral direction during the pinching and pressing steps.

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25. A method according to claim 23, further comprising, prior to the pinching step, heating the cutting edge implement to the sufficient temperature.

26. A method according to claim 23, wherein the cutting edge implement is a hot wire, and further comprising the step of, prior to the pinching and pressing steps, supporting the hot wire for substantially its entire effective cutting length.

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